As of 9.25.09

Proposed Urban Loop Prioritization Process

The purpose of this effort is to create an Urban Loop prioritization process. This document is a draft proposal. Comments and suggestions for improvements are welcomed pertaining to any part of the proposed process. However, the Department is particularly interested in receiving comments on whether the "factors" described herein are relevant and whether the proposed "scoring" methodology is appropriate. **Comments should be received no later than close of business, Monday, November 30, 2009 and sent to the following website:** http://www.ncdot.org/performance/reports/ under Strategic Prioritization.

Objective

Create an Urban Loop prioritization process that supports statewide growth, economic development and enhances mobility.

Background

The Urban Loops program designation and funding was established by the 1989 Highway Trust Fund as part of the Intrastate Highway System. The Trust Fund legislation stated the Intrastate System was "designed to support statewide growth and development objectives and to connect to major highways of adjoining states." There were 7 loops established at that time (Asheville, Charlotte, Winston-Salem, Greensboro, Durham, Raleigh and Wilmington). Three additional loops were later added: Fayetteville and Greenville in 2003 and Gastonia in 2004.

Furthermore, G.S. 136-180 states that a new Interstate or freeway as the revised termini of an urban loop may be accepted if "The Board of Transportation finds that the purposes of the urban loop facility, specifically including reduced congestion and high-speed, safe, regional through-travel service, would be enhanced by the action."

The Urban Loop Program currently totals 353 miles, 140 of which are open to traffic. The estimated cost to complete the program is now around $5.5 Billion. At the current funding rate and the expected increases in construction costs, it will take more than 50 years to complete the program. The challenges in constructing these projects have been many and can be expected to grow in difficulty. Urban loop projects are new location projects that are large, complex and costly and can be very time-consuming to move through the project development process. Ever rising costs of engineering, right-of-way, construction and environmental impacts ensure that further delays in completing the Urban Loop program translate to additional funding needs. Economic development opportunities are lost when the urban loops are not completed. At the same time, revenues to the Department have declined. A prioritization process to help ensure the most cost-effective use of resources to complete the urban loop program is needed.

The 21st Century Transportation Committee report dated December 2008 included the following "policy objective": "Enhance mobility and reduce congestion by accelerated

investment and completion of all planned urban loops with priorities established based on measurable transparent criteria."

Purpose
The purpose of the loop prioritization process is to prioritize the remaining TIP projects that comprise the uncompleted sections of the 10 Loops.

Proposed Principles of an Urban Loop Prioritization Process
The following principles outline what an urban loop process should achieve. When the priorities are established, one should be able to say the priorities meet the test of following principles:

- Projects will support statewide growth and foster economic development
- Selection criteria will be data driven and transparent
- Selection criteria will be consistent with overall Strategic Prioritization Process
- Pilot effort will include a Benefit-Cost Type Methodology
- Pilot effort will be subject to public review and comment
- Secretary of NCDOT will have ability to move projects in final rankings

Proposed Methodology
A urban loop prioritization process would include both "needs" and "benefits" factors. This is based on research of various State's highway prioritization processes. The most mature State prioritization processes have some form of a "benefit-cost" methodology that provides project rankings based on identifying not just the needs for projects but also incorporating the benefits and costs of the projects to meet those needs. Proposed "needs" factors and "benefits" factors are outlined below:

"Needs" Factors
The Strategic Planning Office of Transportation (SPOT) highway prioritization model is currently a needs-based only approach to prioritizing TIP projects but is limited to analyzing current conditions not future conditions. Therefore, the SPOT highway prioritization model is a starting point for establishing priorities for planned urban loops. Since urban loops are Mobility projects on the Statewide Tier, it is appropriate to use the highway prioritization matrix for scoring needs. This also shows consistency with one of the guiding principles. These "needs factors" are briefly described below but are more fully explained in the Attachment.

1. Congestion Score: A measure of recurring congestion on the parallel routes. The higher the congestion score, the more points to the project.
2. Safety Score: A measure of the past crash history indicating whether the crashes on the parallel routes are greater than comparable routes elsewhere in the State. The higher the crash rates, the more points.
3. Infrastructure Health Score: A measure of pavement conditions on the parallel routes. The worse the pavement ratings, the higher the points.

The highway prioritization model also has a qualitative scoring part which gives points based on project rankings of Divisions and local MPO's/RPO's. However, the loop program is a legislatively required program and thus it is not necessary for MPO's/RPO's and Division offices to rank loop projects. Assigning points based on priority rankings would essentially result in a ranking in one area canceling out a ranking in another area. Therefore, it is recommended there is no need to use qualitative ranking data.

"Benefits" Factors

The current highway prioritization model does not account for the "benefits" factors of how projects meet identified deficiencies because the data is not readily available for all TIP projects. A review of various other State's highway prioritization models generated a list of factors that are believed to be applicable to North Carolina for prioritization. With some effort, this data can be obtained or calculated from State databases. The "benefits" factors below are more fully explained in the Attachment.

1. Travel time savings. This is the key measure of whether the urban loop will reduce congestion and provide greater mobility. The benefits are based on travel time savings the loop project would provide to the region. The travel time savings could be calculated using the travel demand model for the area. The higher the travel time savings, the more points.

2. Environmental Readiness Factor. A measure of whether the project could be delayed due to environmental issues. The closer the project is to environmental completion, the higher the points. The project's status in the Merger Process would be used as the readiness factor.

3. Air Quality Conformity. This is another environmental measure. If the project is required to be constructed to meet an air quality conformity determination, it gets points and the closer the horizon year for construction, the higher the points.

4. Economic Development. A measure of the economic impact the project brings to the region. The NC Department of Commerce would provide this information. The measure is the number of direct, indirect and induced employment opportunities created by the urban loop investment. The greater the employment opportunities, the more points.

5. Freight Mobility Factor. Domestic movement of freight will increase dramatically and the urban loops can assist in diverting truck traffic from central business districts, thus increasing mobility and safety and delaying pavement deterioration. The higher the truck volumes in the design year, the higher the points.

6. Multi-Modal. A measure of the Department's commitment to promoting multi-modal options which boost the ability to move people and goods more efficiently on the transportation network. Multi-modal projects receive additional points.

7. Land Use. A measure of whether transportation planning and land use planning are in concert with one another. Where local adopted land use plans show consideration for a future corridor and/or interchanges, projects receive additional points.

Scoring System For Loop Projects: Each project would have a Priority Ratio. The highest Priority Ratio project would be the highest ranked project, the next highest priority ratio project would be the next highest rank project, etc. The Priority Ratio would consist of the numerator being the sum of the points from the "needs" factors plus the

points from the "benefits" factors. The denominator of the Priority Ratio would be the project costs to complete the project using loop funds. This amount includes the preliminary engineering, right-of-way and construction phases of work. It does not include operational or maintenance costs since loop funds are not used for those purposes. The higher the priority ratio, the higher the rank. The details of this scoring system are shown in the Attachment.

Other Considerations:
It is important to remember the remaining TIP Loop projects are already in various stages of planning or project development. Once the rankings are determined, there will still need to be a check on the status of each loop project to help determine the most cost-effective method of scheduling these ranked loop projects. For example, there are other factors that could be considered such as: avoiding lapse of planning documents or permits, building usable segments, applying funds to areas based on construction costs, inflation, volumes of work and capacity of the industry, and whether non-loop (non-NCDOT) funds can be used to minimize the amount of loop funds to complete the project. Examples of non-loop funding contributions might be innovative financing options like TIFIA, tolling, public-private partnerships or local areas making protective purchases of right-of-way. At this time, no additional scoring is contemplated for these factors but they should be a part of the decision on when to schedule projects for funding.

Proposed Approach To Implementing This Urban Loop Prioritization Program
1. September 2, 2009 - Draft process presented to NCDOT Board of Transportation.
2. (October-November) – Solicit input from MPO's in Urban Loop Areas
3. (October-November) - Post on NCDOT website for public comment for a minimum of 30 days.
4. (December- February 2010) - Review the comments, make appropriate adjustments and provide to BOT in the Spring of 2010.
5. By June 1, 2010, the top priority urban loop projects would be added to the NCDOT 5-year Work Program and 10-year Work Plan as appropriate and projects scheduled for funding.

POTENTIAL DETAILED SCORING MATRIX –DRAFT ONLY **Attachment**

"Needs" Factors:

General Theme on "Needs": The higher the deficiencies, the more points.

The highway prioritization model scoring matrix for Statewide Tier Mobility Projects. This data resides in the Department's databases. The data is the most current Volume to capacity and AADT data available – currently this data is 2008 data or newer. The "needs" factor data is derived from the existing parallel routes that carry traffic now that would be expected to travel the new urban loop project. The scoring matrix uses the following quantitative scoring for mobility projects on the Statewide Tier**:**

1. Congestion score (80% of total needs score): The congestion score is a combination of Volume/Capacity (V/C) ratio and Average Daily Traffic (ADT). Sixty percent of this score is the volume/capacity ratio and 40% is AADT. It is recommended to use current NCDOT data.

2. Safety score (10% of total needs score): This is a combination of three equally weighted safety-related factors: Crash Density (The crash density of the study area versus the average crash density of similar facilities) plus Severity Index (measure of the mix of accident severity in a group of accidents at a location) plus Critical Crash Rate (the actual crash rate versus the critical crash rate for the study area). It is recommended to use current "3-year moving average" data.

3 .Infrastructure Health score (10% of total needs score): Pavement Condition Rating on parallel routes. It is recommended to use current NCDOT data.

"Benefits" Factors

General Theme on" Benefit-Cost": The greater the benefits, the more points.

1. Travel Time savings. This is a key measure of whether an urban loop is reducing congestion and thus improving mobility. The greater the travel time savings, the better for mobility, the greater the points. The Department's Transportation Planning Branch (TPB) and various Metropolitan Planning Organizations (MPOs) traffic demand models have data which can provide travel time savings for urban loop projects, i.e. time savings in the area with and without the loop project. The greater the travel time savings, the more points. The Department envisions creating a table to outline the "travel time" savings and points to be awarded based on the travel time savings. To date, this table is not yet defined but proposed points would be between 0-50.

2, Environmental Readiness Factor. This factor shows that for projects already along in the process, more points are given. It encourages early completion of environmental documents. It also is an indicator of whether an urban loop project will successfully complete the Merger Process and obtain the necessary permits. For example, a project where there is an inordinate delay in reaching the next concurrence point, may be an indicator of additional delay to the project. Points are given according to stage of MERGER '01 process. Use this table:

Concurrence Point 1 = 2 points (purpose and need)
Concurrence Point 2 = 4 points (list of alternatives)
Concurrence Point 2A = 6 points (bridging and alignment review)
Concurrence Point 3 = 8 points (LEDPA) Least Environmentally Damaging Project

Alternative
Concurrence Point 4A = 10 points (Avoidance and mitigation)
Concurrence Point 4B = 12 points (30 percent hydraulic review)
Concurrence Point 4C = 14 points (permit drawing review)

3. Air quality conformity. This is another environmental measure. Review which horizon year the project is to be constructed, if any. If it is not required as part of an air quality conformity determination, it gets 0 points. If it is to be constructed within 5 year horizon, it gets 20 points, if ten year horizon it gets 10 points and if it is at 15 year horizon or higher, it gets no points. Notes of caution:1.) Urban areas should not be adding loop projects to air quality conformity determinations just to receive more points and 2.) not all urban loop areas are located in non-attainment areas..

4. Economic Development. This is a measure of the economic impact the project brings to the region. The Department of Commerce has economic analysis models which provide the economic impacts to the surrounding region. NCDOT would provide the inputs as investment schedule and identify the region to be analyzed. It is proposed that the IMPLAN model be used. Details of the plan can be found at http://www.implan.com. The Dept. of Commerce would provide as an output the total economic impacts of direct, indirect, and induced effects, i.e. employment created. Direct effects used here would be the employment opportunities that an initial investment would have upon the region. Indirect effects are employment opportunities that regional suppliers and others will experience due to the initial project investment. Induced effects are employment opportunities due to the change in household purchasing due to change in compensation in the region. A table will be needed that provides points based on the expected total number of employment opportunities created by the urban loop project. Proposed points would range from 0-30.

5. Freight Factor. The State is expected to experience a 67% increase in domestic freight tonnage over the next 20 years (21st Century Report, 2008)- an explosive growth rate. The Department needs to accommodate the increase. Urban loop projects provide the opportunity to divert through truck traffic from central business district areas, thus increasing safety, reducing congestion and helping extend the pavement life. Projects that carry high truck volumes receive more points. Use projected 20-year forecasted traffic. If truck volumes >1000 = 1 point. If truck volumes >10,000 = 10 points (max) and similarly in-between. See Table:
Truck volume > 1,000 = 1 point
Truck volume>2,000 = 2 points
Continue volume to number ratio up to 10,000 and points assigned
Truck volume >10,000 = 10 points (max)

6. Multi-Modal. This factor is used in the Department's overall strategic prioritization process. The Department is committed to multi-modal projects. The definition of "multi-modal" is a project which encourages the use of 2 or more modes (highway, bicycling, walking, rail, ferry, aviation, transit) to achieve enhanced mobility in a travel corridor." Loop Projects must meet the definition of "multi-modal" and then will receive points based on the following scoring:

1. HOV/HOT or Light Rail or Bus Rapid Transit within the highway right-of-way = 9 points.
2. Connection to another transportation terminal (airport, seaport, rail depot, ferry terminal, inter-modal terminal, transit terminal) = 7 points. Connections to another transportation terminal are defined as a Loop Project providing access within one-half mile of the terminal right-of-way. One mile is chosen as a reasonable distance to whether the new loop truly would provide ready access to the terminal.
Points can be received for either or both of these criteria.

7. Land Use. The Department recognizes there needs to be more coordination between land use planning and transportation projects. These issues are not mutually exclusive. Local governments establish land use plans. The Department does transportation planning. When these are coordinated, a better project will result. Where local land use plans have been adopted which show consideration for an urban loop corridor or urban loop interchanges, 10 points will be awarded to the respective loop project.

SUMMARY TABLE OF POINTS
"Needs" Factors
Points based on actual congestion, pavement and safety scores from NCDOT data bases but generally a score of near 100 would likely be high score.

"Benefits" Factors:	**Point Range**
1. Travel Time savings	0-50
2, Environmental Readiness Factor	0-14
3. Air quality conformity	0-20
4. Economic Development	0-30
5. Freight Factor.	0-10
6. Multi-Modal	0-16
7. Land Use	0-10
Total Potential "Benefits" Points	**0-150**

Scoring System

$$\textbf{Priority Ratio} = \frac{\textbf{Needs factor points plus Benefits factor points}}{\textbf{Project Costs (Loop Expenditures)}}$$

Priority Ratio: "Needs" factor points plus "Benefits" factor points in the numerator. Project Costs (representing preliminary engineering, right-of-way and construction) in the denominator.

A Priority Ratio which is a benefit-cost type ratio can be computed. The numerator in the ratio would be the simple addition of "needs" plus "benefits" factors. The denominator would be the sum of the expected project costs for preliminary engineering, right-of-way and construction. These costs would not include operations and maintenance costs that one could expect to see in a traditional benefit-cost methodology because loop funds are only used for the capital expenditure. These project costs would typically be in the millions of dollars which would result in a ratio having multiple decimal places. The

total project costs, therefore, should be shown in “millions” of dollars in order to make the final “priority ratio” a more easily understood number. The higher the priority ratio, the higher the rank.